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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS IN PROPOSED WILDERNESS AREAS ON THE NATIONAL FORESTS IN ALABAMA

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EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS IN PROPOSED WILDERNESS AREAS ON THE NATIONAL FORESTS IN ALABAMA

by

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INTRODUCTION

A biological evaluation was conducted in proposed wilderness areas in the National Forests in Alabama the week of May 28, 1980. The evaluation was conducted by personnel of Forest Insect and Disease Management, State and Private Forestry, U.S. Forest Service. Aerial survey and photography was done by the aerial survey team, State and Private Forestry, located in Doraville, Georgia. The purpose of this evaluation was to determine current status of the southern pine beetle (Dendroctonus frontalis Zimm.) activity within proposed wilderness areas of the National Forests in Alabama.

TECHNICAL INFORMATION

The southern pine beetle attacks all species of southern yellow pine on the Alabama National Forest, loblolly pine, Pinus taeda L., and shortleaf pine, Pinus echinata Mill., are the preferred hosts.

Type of Damage

Damage caused by the southern pine beetle is tree mortality resulting from adult beetles constructing egg galleries in the cambial region of the host trees. Blue-staining fungi (Ceratocystis spp.), introduced by the beetles and secondary insects, accelerate the kill by blocking the vascular system of the tree.

Life Cycle of the Insect

The beetles attack and construct winding egg galleries in the cambium. Eggs are deposited along the galleries. White larvae hatch from the eggs and further mine the cambium and then construct pupal cells in the outer bark. After transforming to adults, the beetles emerge. During the warmer months, the life cycle is completed in about 30 days. There may be as many as seven generations each year.

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Aerial Survey and Ground Checks

Southern pine beetle spots were photographed on 9 x 9 (in.) format with a scale of 1:8000. Basal area, seasonal mode of activity, and numbers of infested trees were recorded for all SPB spots that were ground checked (see maps at end of this report for infestation locations).

RESULTS

Aerial and Ground Surveys

Aerial photo interpretation revealed the numbers of SPB spots (photographed March 31, 1980) thought to be active immediately prior to the biological evaluation.

Shoal Creek	3
Talladega	5
Oakmulgee	42
Black Warrior	33
Total	= 83

These spots ranged in size from 10 trees to several acres. The majority of the spots (47) were in the 100 tree size class. Ten spots were ground checked by personnel from FI&DM, Pineville, Louisiana. Ground check data is summarized in Table 1. All ground checked SPB spots were active. The number of active trees ranged from 3 to 26. Only one of the spots exhibited the classical summer mode of expansion. The rest contained live adult SPB, but very few eggs, galleries or brood could be found. Many trees were characterized by SPB attack being found higher in the tree. These trees usually had bark slippage high on the bole, while bark at the ground level was still tight. Attack/ emergence work could not be done because of this factor.

Alabama had ca. 12 inches of rainfall for the month of April. This could be one of the factors causing the late movement of the SPB into the summer phase of activity, which is primarily a spot expansion phase.

Hazard Rating

Hazard rating was done to determine the potential for SPB losses in a particular area. Generally, any forest condition that causes stressed trees will increase the chance for SPB attack. Some of these stand characteristics are: timber stands with a high pine

Table 1. Summary of ground check data for the proposed wilderness areas on National Forests in Alabama.

Spot No.	Number of Infested Trees	Basal Area Pine	Hazard Rating[a/]
1.	12	100	moderate
2.	3	90	moderate
3.	6	70	low
4.	22 (Summer mode)	100	moderate
5.	7	110	moderate
6.	15	90	moderate
7.	10	120	low
8.	26	110	moderate
9.	2	90	moderate
10.	7	110	moderate
	$\bar{X}$ 11	$\bar{X}$ 100	

[a/] This methodology was developed in East Texas and is being investigated in Alabama. Further analysis and evaluation is necessary before using on an operational basis.

basal area, soil or site conditions that result in frequent drought or flooding, and increasing stand age (older trees are likely to be less vigorous).

All of the SPB spots ground checked were hazard rated (Mason 1979). This should provide an indication of where future SPB attacks are likely to occur. Results of the hazard rating are shown in Table 1. Note that none of these areas rated in the high or very high category.

DISCUSSION

No attempt was made to predict SPB mortality for the summer, 1980. Losses cannot be predicted using current technology when SPB spots are not in the "summer" mode of activity. An examination of the SPB outbreak in the state of Alabama shows that losses continue to be high. The Alabama Forestry Commission reports show 3,622 SPB spots detected from January through March, 1980. Volume salvaged was reported to be 6,460 MBF and 155,442 cords.

The National Forests in Alabama have salvaged more than 13 MMBF of timber as of March, 1980. Both National Forest and private forest managers and owners are still dealing with an SPB outbreak that began in 1979. Each National Forest District continues to have SPB losses in managed timber. One hundred twenty-nine spots were found on the March 24, 1980 flight on the Oakmulgee District and fifty-three spots on the Black Warrior District. The SPB outbreak for the state of Alabama is expected to continue at a moderate to high level.

Large, untreated SPB spots, inside proposed wilderness areas, contribute to the overall SPB population and can be a threat to managed timber nearby.

Alternatives

Alternative 1. Pesticides

Use of pesticides in the proposed areas would be effective, but may not be a viable alternative due to management constraints. Should pesticide treatment be needed, FIDM personnel will provide training and other technical assistance prior to and during project implementation.

Alternative 2. Do nothing and allow the infestation to follow a natural trend.

SPB populations are cyclic. When they increase, large numbers of susceptable pine species are killed. This can occur for several years and then the SPB population and subsequent mortality will decline. This will continue periodically until transition to a climax forest occurs.

Alternative 3. Remove trees through salvage.

Salvage is the method most often used for stopping the growth of existing spots. This strategy involves removing a buffer strip of non-infested trees, all red and green infested trees, and if desired, the trees already killed by the beetles.

To implement this alternative, the buffer strip should be cut first. The buffer strip consists of uninfested pine trees surrounding the green infested trees. It can vary in size from 10-70 feet. There are three major reasons for cutting the buffer strip. They are: 1) to insure that green infested trees which may have escaped detection are removed from the stand, 2) to reduce the chance of the spot spreading beyond its marked boundary if there is a delay between marking the spot and spot treatment, and 3) to insure that beetle activity in the area is disrupted.

The size of the buffer strip needed to prevent spots from continuing to grow depends on three factors:

(1) The length of time it will take to remove or treat the trees in a spot.

(2) The size of the original spot. Larger spots have larger SPB populations. Larger populations of SPB make control efforts more difficult. Also, it takes longer to remove the high timber volume in a large spot.

(3) The intensity of survey after the spot is cut. Where spots are visited infrequently the buffer strip should be larger.

After the buffer strip is cut, all infested trees should be felled toward the center of the spot and removed to prevent beetles from emerging and attacking adjacent trees.

Each area should be checked once cutting and removal of the infested timber is finished. If any newly infested trees are found they should be marked and cut. Each area should then be post control ground checked at least once more and the area watched during aerial surveillance to ensure that no breakouts go untreated.

The effectiveness of this procedure can be limited by several things including: weather, soil conditions, local timber markets, and the willingness or ability of loggers to follow project control plan procedures .

Alternative 4. Removal of only infested and buffer trees.

This is similiar to Alternative 3, except that only the buffer strip and currently infested trees would be cut. Size of the buffer, and cutting priorities, and methods would be the same as in Alternative 3. All vacated trees would be left standing. This would favor predators and parasites of the SPB. The limitations would be the same as for Alternative 3. However, since fewer trees will be removed, there will be less logging impact to the site and less chance of damaging the residual stand.

Alternative 5. Cut-and-leave infested trees.

This is accomplished by felling a 70 ft. buffer strip and all infested trees toward the center of the spot. The purpose is to stop spot growth. Use of this method causes beetles to disperse at a time of year when this behavior is unnatural. This results in a reduction of mass attacked trees and spot growth ceases. The limitations with this control tactic are: 1) it can only be used in the summer (May 1 - September 30) since these are the only months beetles are not dispersing, 2) it should only be used on small spots, normally 40 infested trees or less, and 3) this method has proven effective in Texas, but is still being evaluated in other areas.

RECOMMENDATIONS

SPB losses can be reduced by all alternatives except Alternative 2. Where treatment is needed in inaccessable areas, Alternative 5, cut-and-leave, is recommended. Alternatives 3 or 4 are recommended where treatment is needed in accessable areas. Since spots of 10 active trees or less have a 70% chance of going inactive without causing much additional loss, we recommend that treatment be focused on spots with more than 10 active trees.

PESTICIDE PRECAUTION

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key--out of reach of children and animals--away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, and beneficial insects, fish and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothes and:

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams or wells. Because it is difficult to remove all traces of herbicide from equipment, do not use the same equipment for insecticides or fungicides that you used for herbicides.

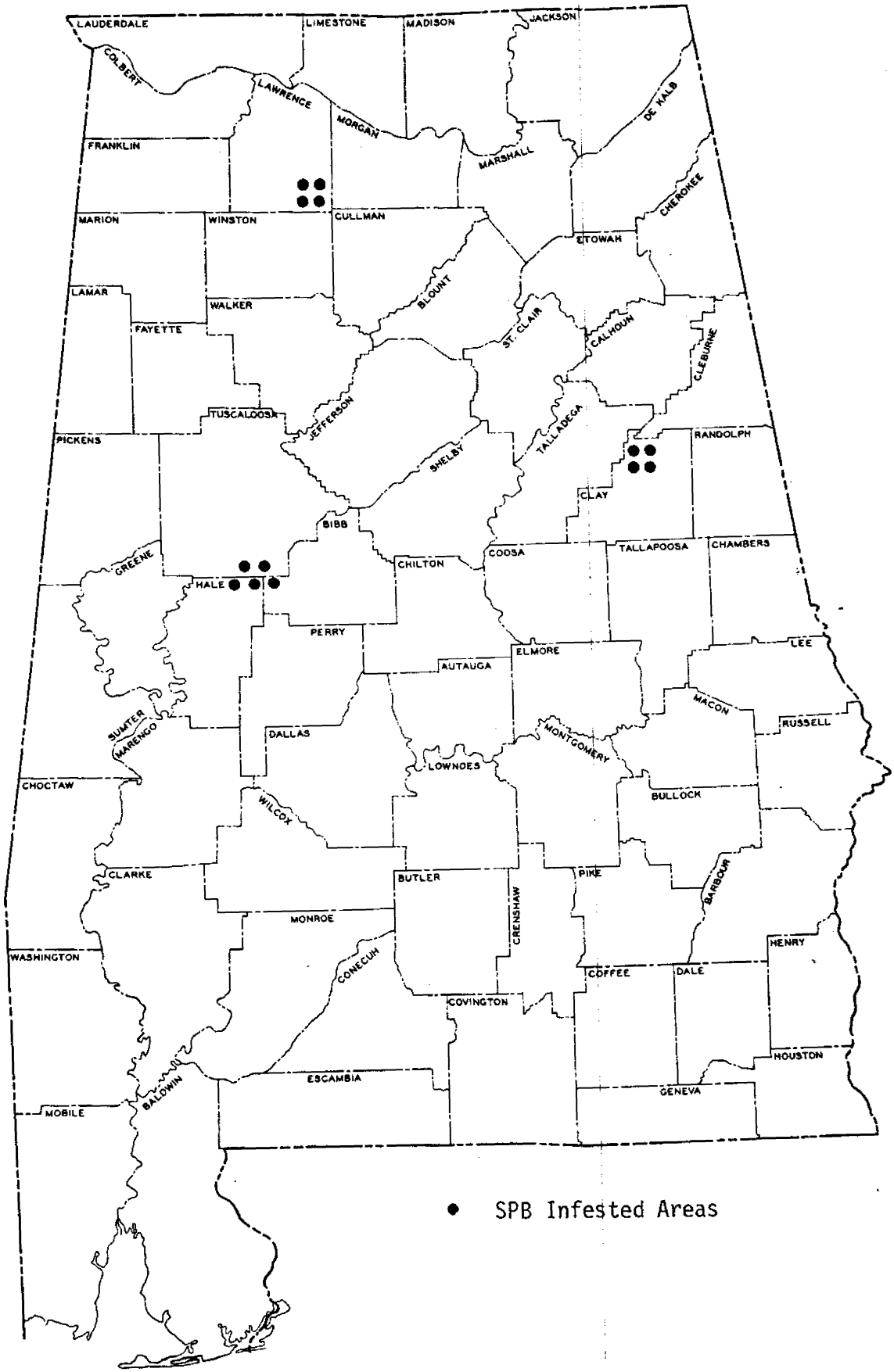
Dispose of empty pesticide containers promptly. Have them buried at a sanitary landfill dump, or crush and bury them in a level isolated place.

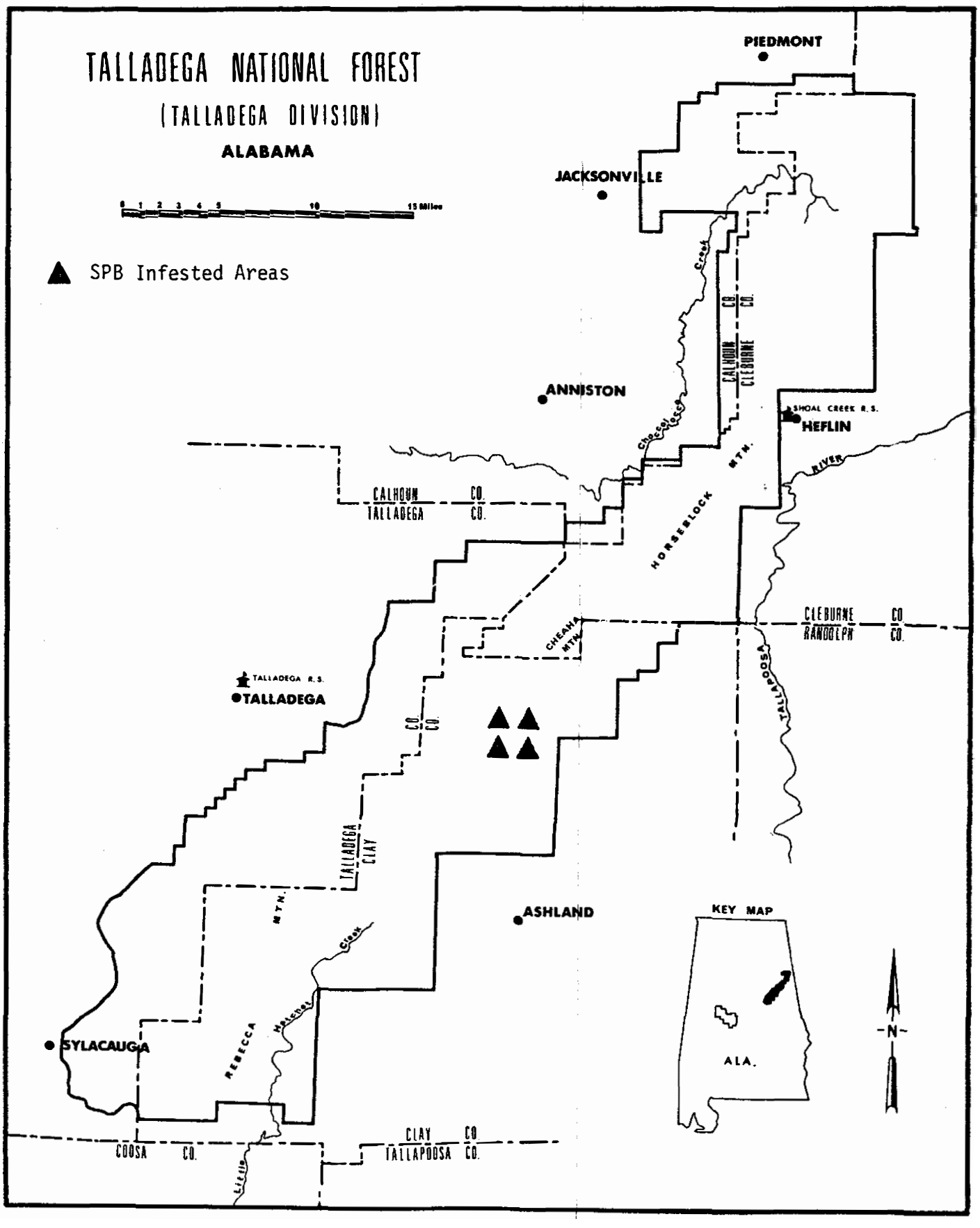
NOTE: Some states have restrictions on the use of certain pesticides. Check your state and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or state extension specialist to be sure the intended use is still registered.

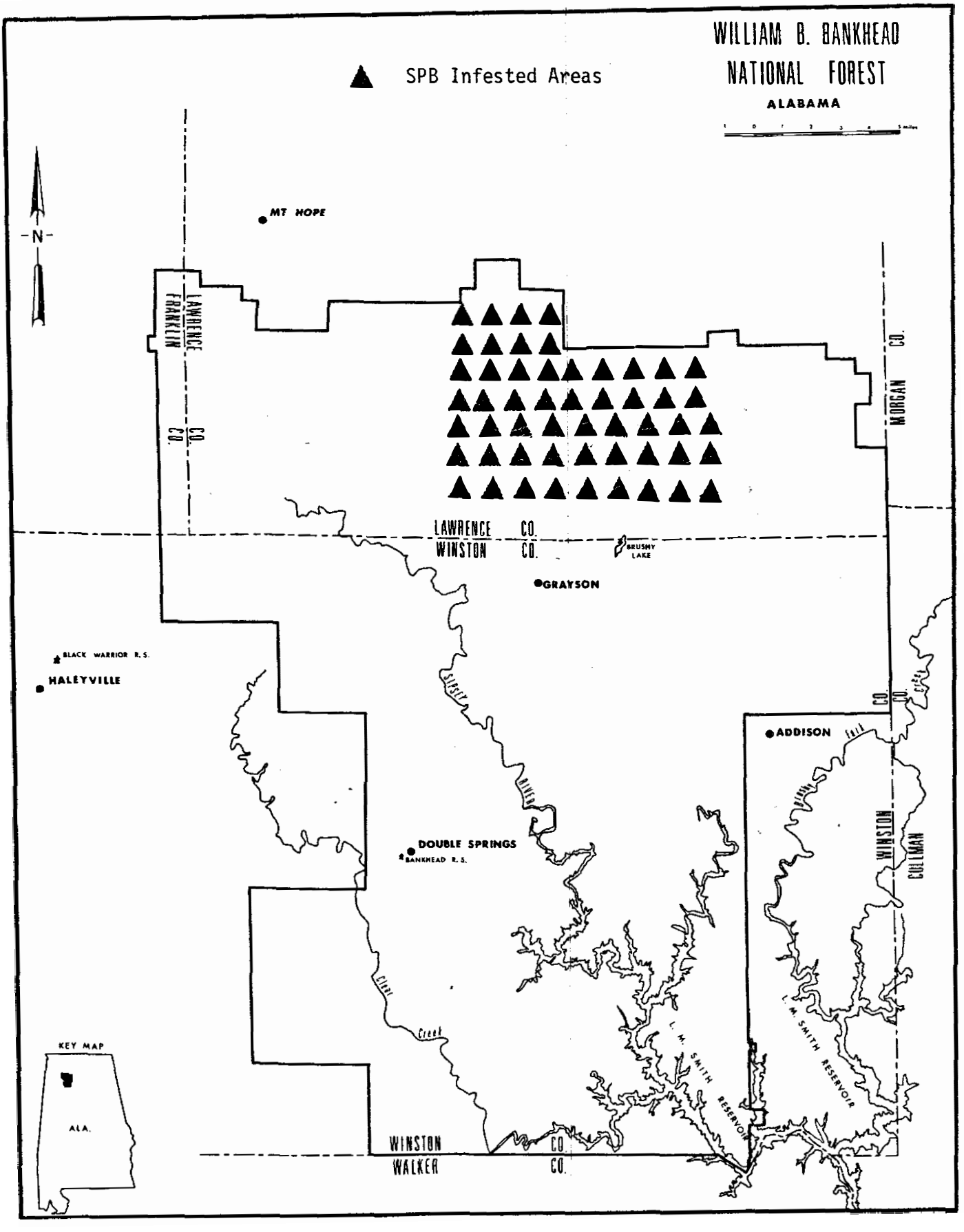
REFERENCES

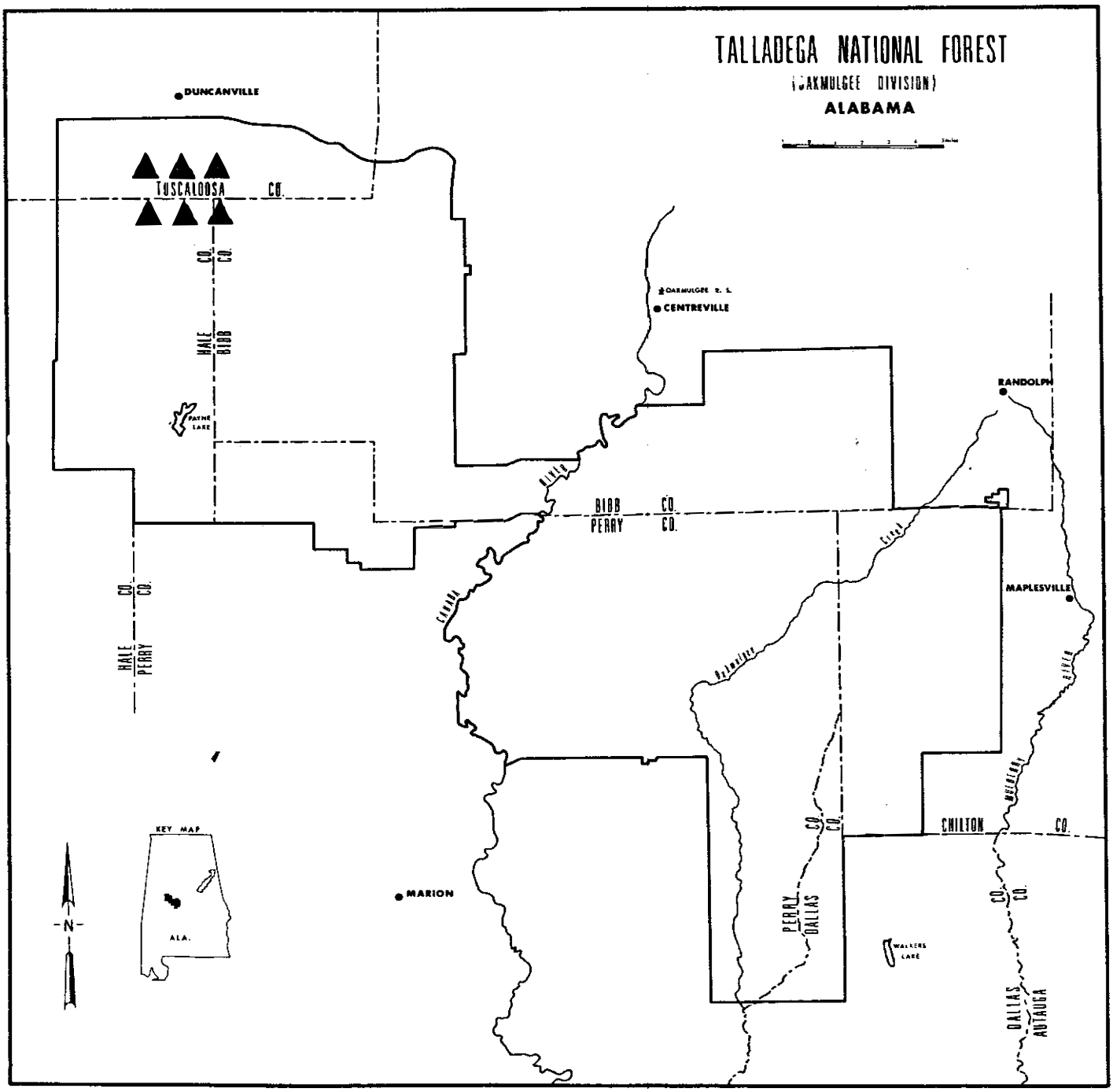
Mason, Garland.
1979. Development, modification, and verification of hazard models for the southern pine beetle. Progress Rept. Co-op Agreement No. 42-290. 11 pp.

1977. Cut-and-Leave, a Method to Reduce Losses From the Southern Pine Beetle. Texas Forest Service Circular 223.


LAUDERDALE
LIMESTONE
MADISON
JACKSON
COLBERT
LAWRENCE
MORGAN
MARSHALL
DE KALB
FRANKLIN
CHEROKEE
MARION
WINSTON
CULLMAN
ETOWAH
LAMAR
WALKER
BLOUNT
ST. CLAIR
CALHOUN
CLEBURNE
FAYETTE
TUSCALOOSA
JEFFERSON
TALLADEGA
RANDOLPH
PICKENS
SHELBY
CLAY
BIBB
GREENE
COOSA
TALLAPOOSA
CHAMBERS
HALE
CHILTON
PERRY
ELMORE
LEE
AUTAUGA
MACON
SUMTER
MARENGO
DALLAS
MONTGOMERY
RUSSELL
LOWNDES
CHOCTAW
BULLOCK
WILCOX
CLARKE
BUTLER
PIKE
BARBOUR
CRENSHAW
MONROE
HENRY
WASHINGTON
CONECUH
COFFEE
DALE
COVINGTON
HOUSTON
ESCAMBIA
GENEVA
BALDWIN
MOBILE
SPB Infested Areas


TALLADEGA NATIONAL FOREST
(TALLADEGA DIVISION)
ALABAMA
0 1 2 3 4 5 10 15 Miles
SPB Infested Areas
PIEDMONT
JACKSONVILLE
ANNISTON
HEFLIN
SHOAL CREEK R.S.
TALLADEGA R.S.
TALLADEGA
SYLACAUGA
ASHLAND
CALHOUN CO.
TALLADEGA CO.
CLEBURNE CO.
RANDOLPH CO.
CLAY CO.
TALLAPOOSA CO.
COOSA CO.
CHEAHA MTN.
HORSEBLOCK MTN.
KEY MAP
ALA.
N


WILLIAM B. BANKHEAD
NATIONAL FOREST
ALABAMA
SPB Infested Areas
N
MT HOPE
LAWRENCE CO.
FRANKLIN CO.
MORGAN CO.
LAWRENCE CO.
WINSTON CO.
BRUSHY LAKE
GRAYSON
BLACK WARRIOR R.S.
HALEYVILLE
ADDISON
DOUBLE SPRINGS
BANKHEAD R.S.
WINSTON CO.
CULLMAN CO.
L. M. SMITH RESERVOIR
KEY MAP
ALA.
WINSTON CO.
WALKER CO.



▲ SPB Infested Areas